

43. (NEW) A protected die, comprising:

a sensitive area disposed on a surface of the die, the area comprising a released MEMS device having a released MEMS element;

a performance-enhancing coating disposed directly on the released MEMS element; and

a vapor-deposited, water-insoluble temporary protective coating disposed directly on top of the performance-enhancing coating;

wherein the protective coating is insoluble in organic solvents; and

wherein the die is attached and electrically interconnected to a package.

44. (NEW) The die of claim 43, wherein the temporary protective coating is sufficiently thin so as to not immobilize the released MEMS element.

- *A Clean Copy of the Amended and New Claims is attached.*

REMARKS

In the Specification

The Specification was amended to update information about issuance of the parent application. No new matter was entered.

In the Claims

Status of Claims

- Claims **1-34** are pending.
- Claims **31-34** were cancelled, as being drawn to a non-elected invention.
- Claims **15** and **16** were cancelled.
- Claims **1, 10, 17, 19, 25, 28, 29, and 30** were amended.
- New claims **35-44** were added.

Claim Rejections – 35 U.S.C. 102(b,e)

Applicants amended independent claims 1 and 25 to better define and further distinguish certain embodiments of the present invention over the art cited by the Office. No new matter has been added, and the Specification fully supports the amendments.

Degani et al.

Claims 1, 7, 15, 17, 18, and 21-26 were rejected under 35 U.S.C. 102(b) as being anticipated by Degani et al. (5,516,728). Of these, claims 1 and 25 are independent, and the others depend from either claim 1 or 25.

To establish a *prima facie* case of anticipation under 35 U.S.C. 102(b,e), the single prior art reference must teach all of the claim limitations, as arranged as they are in the claim.

Degani teaches using a temporary protective layer to cover and protect sensitive areas of a chip during wafer dicing. The protective coating is removed from the substrate after dicing. *Degani* teaches that the protective coating is **soluble in polar organic solvents**, such as lower alkyl alcohol solvents, wherein the alkyl group contains four or less carbon atoms (e.g., methanol, ethanol, propanol, and isopropanol). See *Degani et al.*, Col. 3, lines 23-25.

In contrast, applicant's amended claims 1 and 25 recite, *inter alia*, that the temporary protective coating is **insoluble in organic solvents**.

Since *Degani* does not teach the use of protective coatings that are **insoluble in organic solvents**, not all of the limitations of applicant's amended claims 1 and 25 are present in the single prior art reference cited by the Office. Hence, a *prima facie* case of anticipation under 102(b) cannot be made.

Applicants respectfully submit that the rejection of independent claims 1 and 25 under 102(b) as being anticipated by *Degani et al.* has been overcome.

Claim 15 was cancelled.

Likewise, applicants submit that the rejections of dependent claims 7, 17, 18, and 21-26 under 102(b) with respect to *Degani et al.* have been overcome, due to their respective dependencies on independent claims 1 and 25.

Kaeriyama et al.

Claims 1-7, 18 and 21-26 were rejected under 35 U.S.C. 102(b) as being anticipated by Kaeriyama et al. (5,872,046).

Kaeriyama teaches using a temporary protective layer to cover and protect sensitive areas of a chip during partial wafer dicing and cleaning. The protective coating is subsequently removed before the wafer is broken along streets to form individual dies. *Kaeriyama* teaches that the protective coating is preferably a photoresist; and gives a single example of a suitable coating, i.e., Microelectronics PFR1X710-D75 photoresist. (See *Kaeriyama et al.*, Col. 5, lines 13-16). While *Kaeriyama* does not teach how the protective coating is removed, it is well known

in the microelectronics industry that acetone (a common organic solvent) is typically used to remove photoresist coatings. Hence, *Kaeriyama* teaches the use of a protective coating that is **soluble in organic solvents**.

Kaeriyama does not teach the use of protective coatings that are **insoluble in organic solvents**.

In contrast, applicant's amended claims 1 and 25 recite, *inter alia*, that the temporary protective coating is **insoluble in organic solvents**.

Since *Kaeriyama* does not teach the use of a protective coating that is **insoluble in organic solvents**, not all of the limitations of applicant's amended claims 1 and 25 are present in the single prior art reference cited by the Office. Hence, a *prima facie* case of anticipation under 102(b) cannot be made.

Applicants respectfully submit that the rejection of independent claims 1 and 25 under 102(b) as being anticipated by *Kaeriyama et al.* has been overcome.

Likewise, applicants submit that the rejections of dependent claims 2-7, 18, 21-24 and 26 under 102(b) with respect to *Kaeriyama et al.* have been overcome, due to their respective dependencies on independent claims 1 and 25.

Kao et al.

Claims 1-7, 18 and 20-26 were rejected under 35 U.S.C. 102(e) as being anticipated by Kao et al. (5,923,995).

Kao teaches an apparatus to protect microelectromechanical systems during a singulation process comprising, *inter alia*, a water-soluble first protective layer [820] that covers microelectromechanical systems [810] located on a wafer [800]. Kao also teaches a water insoluble second protective layer [830] that covers the first protective layer [820]. See *Kao et al.*, Fig. 6, and col. 7, lines 50-65. Kao explains that this specific arrangement of layers (wherein the second protective layer comprises a water insoluble material) is necessary to shield the water-soluble first protective layer from the destructive jet of high-pressure water during wafer sawing using a water jet (See *Kao et al.*, Col. 5, lines 39-45).

Kao does not teach the use of a water insoluble first protective coating that is in direct contact with the sensitive area. Instead, Kao teaches that the first protective coating is **water-soluble**.

In contrast, applicant's amended claims 1 and 25 recite, *inter alia*, that the temporary protective coating directly contacts the sensitive area and is **water insoluble**. This is **exactly opposite** of the teachings of Kao (i.e., that the first protective layer is **water-soluble**).

Since Kao does not teach the use of a first protective coating that is **water insoluble**, not all of the limitations of applicant's amended claims 1 and 25 are present in the single prior art reference cited by the Office, as arranged as they are in the claim. Hence, a *prima facie* case of anticipation under 102(e) cannot be made.

Applicants respectfully submit that the rejection of independent claims 1 and 25 under 102(e) as being anticipated by *Kao et al.* has been overcome.

Likewise, applicants submit that the rejections of dependent claims **2-7, 18, 20-24** and **26** under 102(e) with respect to *Kao et al.* have been overcome, due to their respective dependencies on independent claims **1** and **25**.

Accordingly, claims **1-7, 18, and 20-26** are now in condition for allowance.

Claim Rejections – 35 U.S.C. 103(a)

Kao et al.

The Office rejected claims **8-17, 19** and **27** under 35 U.S.C. 103(a) as being unpatentable over *Kao et al.* as applied to claims **1-7, 18, and 20-26** above.

Claims **15** and **16** were cancelled

To establish a *prima facie* case of obviousness under 35 U.S.C. 103(a), the prior art reference (or references when combined) must teach or suggest all of the claim limitations, as arranged as they are in the claim.

The Office asserts in the first office action that “*Kao discloses the claimed invention except for the specific materials of the protective coating that protects a sensitive area on a wafer.*” Applicants respectfully traverse.

As presented above, *Kao* teaches that the protective coating in direct contact with the sensitive area (i.e., the first coating) is **water-soluble**.

In contrast, applicant's claims **8-14, 17, 19** and **27**, which depend from amended claims **1** and **25** recite, *inter alia*, that the temporary protective coating directly contacting the sensitive area is **water insoluble**.

Since *Kao* **does not teach** the use of a first protective coating that is **water insoluble**, not all of the limitations of applicant's claims **8-14, 17, 19** and **27** are present in the art cited by the Office, as arranged as they are in the claim. Hence, a *prima facie* case of obviousness under 103(a) cannot be made.

The Office's argument that “*Kao simply states the material used to protect the micromechanical system may be composed of any substantially insoluble material known to those of ordinary skill the art*” is moot because *Kao* does not teach all of the limitations of claims **8-14, 17, 19** and **27** in the first place.

Applicants respectfully submit that the rejection of dependent claims **8-14, 17, 19** and **27** under 103(a) as being unpatentable over *Kao et al.* has been overcome.

Accordingly, claims **8-14, 17, 19** and **27** are now in condition for allowance.

Kao et al. in view of Smith et al.

The Office rejected claims **28-30** under 35 U.S.C. 103(a) as being unpatentable over *Kao et al.* as applied to claims **1-7, 18** and **20-26** above, and further in view of Smith et al. (US Patent 5,766,367).

Applicants amended independent claim **28** to better define and further distinguish certain embodiments of the present invention over the art cited by the Office. No new matter has been added, and the Specification fully supports the amendments.

To establish a *prima facie* case of obviousness under 35 U.S.C. 103(a), the prior art reference (or references when combined) must teach or suggest all of the claim limitations, arranged as they are in the claim.

The Office suggests combining the performance enhancing coating (PEC) of *Smith et al.* with the micromechanical system of *Kao et al.* Applicants assume that the Office would construct such a hypothetical structure by locating the PEC layer in-between the micromechanical structures [810] and *Kao's* first **water-soluble** protective layer [820]. Any other arrangement would destroy the functionality of *Kao's* invention, or *Smith's* invention, or both.

In contrast, applicant's amended claim **28** recites, *inter alia*, that the temporary protective coating is disposed directly on top of the performance enhancing coating and is water insoluble.

Since the combination suggested by the Office **does not teach** the use of a **water insoluble** protective coating **disposed directly on top of** the performance enhancing coating, then not all of the limitations of applicant's amended claim **28** are present in the combination suggested by the Office, as arranged as they are in the claim. Hence, a *prima facie* case of obviousness under 103(a) cannot be made.

Applicants respectfully submit that the rejection of independent claim **28** under 103(a) as being unpatentable over *Kao et al.* in view of *Smith et al.* has been overcome.

Claims **29** and **30** depend from independent claim **28**.

Likewise, applicants submit that the rejections of dependent claims **29** and **30** under 103(a) as being unpatentable over *Kao et al.* in view of *Smith et al.* have been overcome, due to their dependencies on independent claim **28**.

Accordingly, claims **28-30** are now in condition for allowance.

**Other Minor Amendments to the Claims
Made for Reasons Unrelated to Patentability**

Claim 10

Claim **10** was amended to better conform the language of the claim to the text of the Specification (see Specification p. 12, second paragraph), not in response to any rejections or objections by the Office. No new matter has been added.

Claim 17

Claim 17 was amended to include two additional types of protective coatings that were previously disclosed in the Specification (see Specification p. 9, second paragraph), not in response to any rejections or objections by the Office. No new matter has been added.

Claims 29 and 30

Claims 29 and 30 were amended to conform the claim language to a proper Markush format, not in response to any rejections or objections by the Office. No new matter has been added.

New Claims 35-44

Applicants have added new claims 35-44. No new matter has been added, and the Specification fully supports these new claims. New claims 26-35 include only limitations that would be reasonably expected to be claimed. Therefore, no new search of prior art is required.

Conclusion

In this Amendment, a total of 6 claims were cancelled (including 1 cancelled independent claim); and a total of 10 new claims were added (including 1 new independent claim), for a net gain of 6 total claims (with no changes in the number of independent claims). Accordingly, the Office is hereby authorized to charge $6 \times \$ 18 = \$ 108$ (large entity fee) for additional claims to **Deposit Account # 19-0131**.

Applicants have responded to each and every objection and rejection, and urge that claims 1-14 and 17-30; and new claims 35-44 as presented are now in condition for allowance.

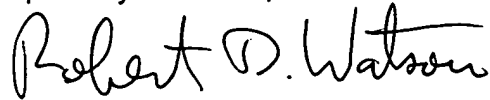
Applicants request expeditious processing to issuance.

One-Month Extension of Time

The Office is hereby authorized to charge **\$110** (large entity fee) for an Extension for Response Within First Month under 37 CFR 1.17(a)(1) to **Deposit Account # 19-0131**.

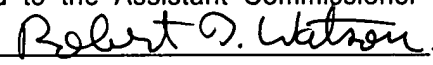
The total additional fee to be charged for this Response is $\$ 108 + \$ 110 = \$ 218$.

Respectfully submitted,



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